CLAIMS

What is claimed is:

1. A process for detecting an aluminum-based material deposited onto a titanium-based gas turbine engine component during engine operation, comprising the steps of:

immersing at least a portion of the titanium-based component, which has been subjected to engine operation, into an acid solution to form an etched component, the acid solution comprising sodium fluoride, sulphuric acid and water;

removing the etched component from the solution; and

visually inspecting the etched component for dark areas in contrast to light areas, the dark areas indicating deposited aluminum-based material.

2. The process of claim 1, wherein the titanium-based component is a titanium alloy blade.

3. The process of claim 1, wherein at least a portion of the component is immersed in an acid solution comprising, per liter i) about 15 g/liter of sodium fluoride; ii) about 75 g/liter of sulphuric acid having a density of about 1.84; and iii) balance water, for between about 45 seconds and about 3 minutes.

4. The process of claim 2, wherein only a blade tip is immersed in the solution.

5. The process of claim 1, wherein the entire component is immersed in the solution.

6. The process of claim 1, wherein the etched component is visually inspected at a magnification of about 4x to about 25x.

7. The process of claim 6, wherein the etched component is visually inspected at a magnification of about 10x.

8. The process of claim 1, wherein at least a portion of the component is immersed in an acid solution comprising, per liter i) about 5 to about 50 g/liter of sodium fluoride; ii)

about 50 to about 100 g/liter of sulphuric acid having a density of about 1.84; and iii) balance water.

9. The process of claim 8, wherein the at least a portion of the component is immersed in the solution from between about 1 minute and about 5 minutes.

10. The process of claim 8, wherein the at least a portion of the component is immersed in the solution from about between about 25 seconds and about 1 minute.

11. The process of claim 1, wherein the aluminum-based material is AlSi.

12. A process for detecting an aluminum-based material deposited onto a titanium-based gas turbine engine component during engine operation, comprising the steps of:

immersing, for between about 45 seconds and about 3 minutes, at least a portion of the titanium-based component, which has been subjected to engine operation, into an acid solution to form an etched component, the acid solution comprising, per liter:

i) about 15 g/liter of sodium fluoride;

ii) about 75 g/liter of sulphuric acid having a density of about 1.84; and

iii) balance water;

removing the etched component from the solution;

washing the etched component in water, followed by drying; and

visually inspecting the etched component under magnified conditions for dark areas in contrast to light areas, the dark areas indicating deposited aluminum-based material.

13. The process of claim 12, wherein the titanium-based component is a titanium alloy blade.

14. The process of claim 13, wherein only a blade tip is immersed in the solution.

15. The process of claim 12, wherein the entire component is immersed in the solution.

16. The process of claim 12, wherein the etched component is visually inspected at a magnification of about 4x to about 25x.

17. The process of claim 16, wherein the etched component is visually inspected at a magnification of about 10x.

18. The process of claim 12, wherein the aluminum-based material is AlSi.

19. A process for detecting an aluminum-based material deposited onto a titanium-based gas turbine engine component during engine operation, comprising the steps of:

swab etching at least a portion of the titanium-based component, which has been subjected to engine operation, with an acid solution to form an etched component, the acid solution comprising sodium fluoride, sulphuric acid and water; and

visually inspecting the etched component for dark areas in contrast to light areas, the dark areas indicating deposited aluminum-based material.

20. The process of claim 19, wherein the swab etching step comprises saturating an applicator with the acid solution and repeatedly applying the acid solution to at least a portion of the titanium-based component.

21. The process of claim 20, wherein the applicator is selected from the group consisting of a cloth, a cotton wool material and spray device.

22. A process for detecting an aluminum-based material deposited onto a titanium-based gas turbine engine component during engine operation, comprising the steps of:

immersing at least a portion of the titanium-based component, which has been subjected to engine operation, into an acid solution to form an etched component, the acid solution comprising i) calcium fluoride, potassium fluoride or hydrofluoric acid, ii) sulphuric acid and iii) water;

removing the etched component from the solution; and

visually inspecting the etched component for dark areas in contrast to light areas, the dark areas indicating deposited aluminum-based material.

23. A process for detecting an aluminum-based material deposited onto a titanium-based gas turbine engine component during engine operation, comprising the steps of:

swab etching at least a portion of the titanium-based component, which has been subjected to engine operation, with an acid solution to form an etched component, the acid solution comprising i) calcium fluoride, potassium fluoride or hydrofluoric acid, ii) sulphuric acid and iii) water; and

visually inspecting the etched component for dark areas in contrast to light areas, the dark areas indicating deposited aluminum-based material.